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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/902,374	07/10/2001	Charles N. Archie	FIS9-2001-0090	8836

29154 7590 07/26/2005

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EXAMINER

JOHNSTON, PHILLIP A

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/902,374

Applicant(s)

ARCHIE, CHARLES N.

Examiner

Phillip A. Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Detailed Action

1. This Office Action is submitted in response to Amendment filed 5-27-2005, wherein claims 1,8,10,12,19, and 20 have been amended. Claims 1-26 are pending.

Examiners Response to Arguments

2. Applicants arguments are moot in view of new grounds for rejection.

Claims Rejection – 35 U.S.C. 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su, U. S. Patent No. 6,388, 253 to Su, in view of Tanaka, U.S. Patent No. 6,616,759.

Su (253) discloses the following;

(a) Obtaining a focus exposure matrix of critical dimension (CD) waveforms and images as a function of stepper focus parameters, as recited in claims 1,3,4,6-11,14,

15,17,18,19,21,23,25, and 26. See Column 4, line 57-67; Column 5, line 1-24; and Figures 1A and 6B below;

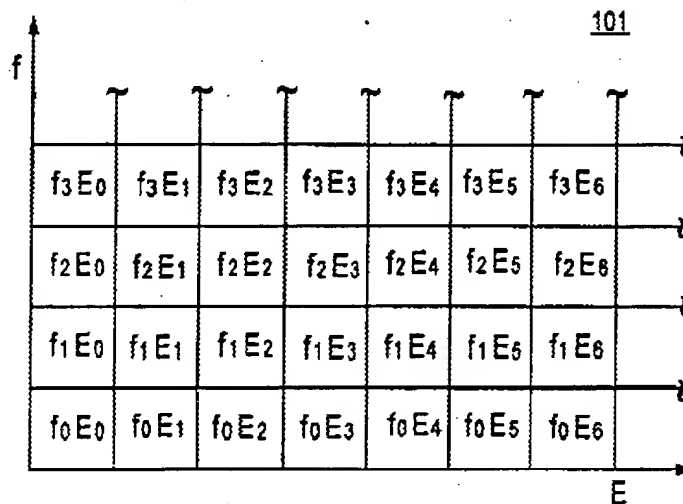


FIG. 1

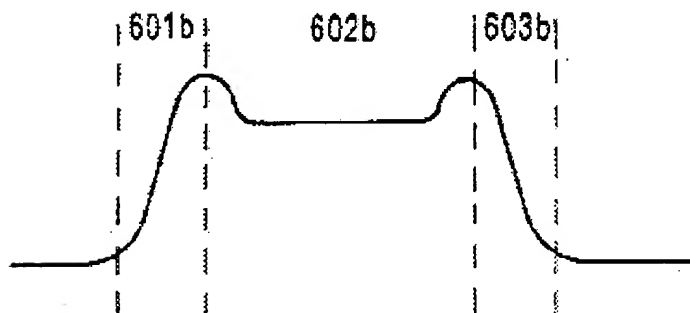


FIG. 6B

(b) Generating a library of reference features (approximate CD values) from the analysis of the matrix waveform data, as recited in Claims 1-4,6-8,10,12-15,17-23,25, and 26. See Column 4, line 12-45; and Column 5, line 6-57;

(c) Performing an analysis of the data to generate a "golden waveform", as recited in Claims 2-4,6-8,10,12-15,17-23,25, and 26. See Column 5, line 48-67; and Column 6, line 1-4;

(d) Comparing the target waveform to the "golden waveform" or one of the library of reference waveforms by using an algorithm to "fit a curve" as in Figure 6B above, thereby obtaining the best "matching score" or correlation (best fit), as recited in claims 1,8,10,12,19, and 20. See Column 10, line 26-42;

(e) Selecting a target feature, as recited in claims 2,13,19, and 21. See Column 6, line 5-21;

(f) Using plural parameters (at least three) to obtain a feature waveform including; CD as measured with a CD-SEM and/or AFM, as well as other sensitive parameters such as edge width and profile grade. The measured parameters are linked to photolithography adjustable parameters such as stepper focus and exposure settings, as recited in claims 1,8,10,12,19, and 20. See Column 3, line 52-67; and Column 5, line 20-39.

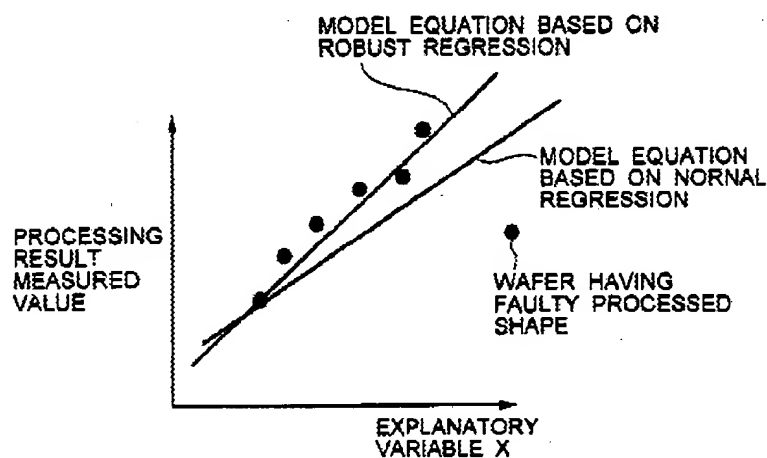
Su (253) as applied above fails to teach a method of calibrating the waveform data by determining at least three best-fit data parameters, and combining the best-fit data parameters with a stepper focus parameter and a critical dimension measurement to improve the linearity of the critical dimension waveform, as recited in claims 1,8,10,12,19, and 20.

However, Tanaka (759) discloses a method of monitoring semiconductor manufacturing that includes the generation of a model equation from three parameters

of sensed data, and using the best fit of the three parameters via multiple regression to improve linearity of the data. See Column 3, line 57-67; Column 5, line 5-37, and Figure 6 below.

It is implied herein that removing faulty process shapes in accordance with Tanaka (759) is equivalent to improving linearity, as recited in claims 1,8,10,12,19, and 20.

FIG. 6



Therefore it would have been obvious to one of ordinary skill in the art that the critical dimension apparatus and method of Su (253) can be modified to use the model equation and regression method of Tanaka (759), to provide a robust regression method, to correct a prediction model equation by removing faulty process shape data, thereby controlling and/or monitoring a semiconductor processing apparatus while predicting its processing results.

Conclusion

5. The Amendment filed on 5-27-2005 has been considered but the arguments are moot in view of new grounds for rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

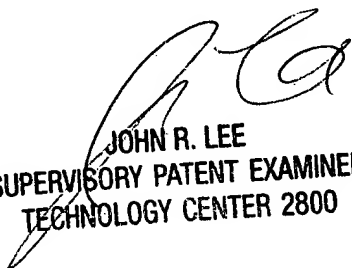
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

6. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 6:30 am to 3:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor John Lee can be reached at (571) 272-2477. The fax phone number for the organization where the application or proceeding is assigned is 703 872 9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

July 13, 2005


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800